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ATTORNEY DOCKET NO.

SERIAL NO.

221-Div.

09/483,859

INFORMATION DISCLOSURE STATEMENT

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APPLICANT

Gautam Bhandari and Thomas H. Baum

FILING DATE

January 17, 2000

GROUP

TBA

1762

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	PATENT NUMBER	ISSUE DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
<i>[Signature]</i>	2,839,421	6/58	Albisetti	106	287.17	
<i>[Signature]</i>	AB 3,076,834	2/63	Norton	556	175-X	
<i>[Signature]</i>	AC 5,204,314	4/93	Kirlin, et al.	505	001	
<i>[Signature]</i>	AD 5,711,816	1/98	Kirlin, et al.	118	726	
<i>[Signature]</i>	AE 3,437,516	4/1969	C. Tamborski	417	1072	

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DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO
AF GB 976,573	1964 Nov. 25, 1964	Britain			
AG DE3447635A1	July 18, 1985	Germany			Abstract only

OTHER DOCUMENTS (Including Author, Title, Journal-Date, Page Number, Etc.)

AH	Yu. E. Ovchinnikov, et al. "The Crystal Structures of the Titanium-Containing Organosilicon Compounds (SiMe ₃) ₃ and (SiMe ₃) ₂ GeTi(Nme ₂) ₃ " <i>Metalloorg. Khim. (Organometallic Chem. In USSR)</i> (1992, Vol. 5, p. 564. <i>no month</i>
AI	Yu. E. Ovchinnikov Yu. T. Struchkov M. V. Ustinov, M.G. Voronkov, "Crystal and Molecular Structure of Organosilicon Derivatives of Titanium (IV) (Me ₃ Si) ₃ SiTi(Net ₂) ₃ and CiTi[N(SiMe ₃) ₂] ₃ <i>Izu. Akad. Nauk SSSR, Ser. Khim.</i> , 1993, p. 1473. <i>no month</i>
AJ	M.T. Bohr, "Scaling of High Performance Interconnects", <i>Advanced Metallization and Interconnect Systems for ULSI Applications in 1996</i> , MRS Publishers, 1997, p.3. <i>no month</i>
AK	M.B. Small, D. Pearson, "On-Chip Wiring for VLSI Status and Directions", <i>IBM J. Res. Dev.</i> , 1990, Vol. 34, pp. 858-867. <i>no month</i>
AL	S. P. Muraka, R. J. Gutman, A. Kaloyeros and W. A. Lanford, "Advanced Multilayer Metallization Schemes with Copper as Interconnection Metal", <i>Thin Solid Films</i> , 1994, Vol. 236, pp. 257-266 <i>no month</i>
AM	K. Holloway, et al., "Tantalum as a Diffusion Barrier Between Copper and Silicon: Failure Mechanism and Effect of Nitrogen Additions," <i>J. Appl. Phys.</i> , 1992 Vol. 71, pp. 5433-5444 <i>no month</i>
AN	J.O. Olowolafe, C.J. Mogab, R.B. Gregory and M. Kottke, "Interdiffusions in Cu/Reactive-Ion-Sputtered TiN, Cu/Chemical-Vapor-Deposited TiN, Cu/TaN and TaN/Cu/TaN Thin-Film Structures: Low Temperature Diffusion Analyses", <i>J. Appl. Phys.</i> , 1992, Vol. 72, pp. 4099-4103. <i>no month</i>
AO	E. Kolawa, "Tantalum-Based Diffusion Barriers in Si/Cu VLSI Metallizations", <i>J. Appl. Phys.</i> , 1991, Vol. 70, pp. 1369-1373 <i>no month</i>
AP	S.-Q. Wang, et al., "Step Coverage Comparison of Ti/TiN Deposited by Collimated and Uncollimated Physical Vapor Deposition Techniques", <i>J. Vac. Sci. Technol. B</i> , 1996, Vol. 14(3), pp. 1846-1852.
AQ	J.C. Fuggle et al, "Reactions of Niobium and Tantalum Pentafluorides with Trimethylsilyldiethylamine and with Trimethylsilyl Chloride", 1972, pp. 1766-1767 <i>no month</i>

Continue on Page 2

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FORM PTO-1449 US Dept. of Commerce Patent and Trademark Office		ATTORNEY DOCKET NO. 221-Div.		SERIAL NO. 09/483,859		
INFORMATION DISCLOSURE STATEMENT (use several sheets if necessary) <div style="border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block; transform: rotate(-15deg);"> APR 11 2000 PATENT & TRADEMARK OFFICE </div>		APPLICANT Gautam Bhandari and Thomas H. Baum				
		FILING DATE January 17, 2000		GROUP TBA 1762		
		U.S. PATENT DOCUMENTS				
EXAMINER INITIALS	PATENT NUMBER	ISSUE DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
<div style="font-size: 2em; transform: rotate(-45deg); position: absolute; left: -40px; top: 0;"> 1762 </div>	AR	5,034,372	7/23/91	Matsuno et al.	505	1
	AS	5,110,622	5/5/92	Hasegawa et al.	427	126.1
	AT	5,120,703	6/9/92	Snyder et al.	505	1
	AU	5,280,012	1/18/94	Kirlin et al.	505	1
	AV	5,376,409	12/27/94	Kaloyeros et al.	427	248.1
FOREIGN PATENT DOCUMENTS						
	DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO
OTHER DOCUMENTS (Including Author, Title, Journal-Date, Page Number, Etc.)						
<div style="font-size: 2em; transform: rotate(-45deg); position: absolute; left: -40px; top: 0;"> 1762 </div>	AW	K. Hieber, "Structural and Electrical Properties of Ta and Ta Nitrides Deposited by Chemical Vapor Deposition", <i>Thin Solid Films</i> , 1974, Vol. 24, pp. 157-164 <i>no month</i>				
	AX	R. Fix, R. G. Gordon, D.M. Hoffman, "Chemical Vapor Deposition of Vanadium, Niobium and Tantalum Nitride Thin Films", <i>Chem. Mater.</i> , 1993, Vol. 5, pp. 614-619 <i>no month</i>				
	AY	D.N. Williams et al, "Half-sandwich Imido Complexes of Niobium and Tantalum", <i>J. Chem. Soc Dalton Trans.</i> , 1992, pp. 739-751 <i>no month</i>				
	AZ	J. Li, T. E. Seidel, J. W. Mayer, "Copper-Based Metallization in ULSI Structures", <i>MRS Bulletin</i> , 1994, Vol. XIX, No. 8, pp. 15-18. <i>no month</i>				
	BA	S.M. Rossangel, et al., "Thin, High Atomic Weight Refractory Film Deposition for Diffusion Barrier, Adhesion Layer, and Seed Layer Applications" <i>J. Vac. Sci. Technol. B</i> , Vol. 14, pp. 1819-1827 <i>no date</i>				
	BB	D. Ugolini, S.P. Kowalczyk, F.R. McFeely, "Photoelectron Spectroscopy Studies of Chemical Vapor Deposition of Ta from a TaF ₅ Precursor on Si and SiO ₂ Substrates" <i>J. Appl. Phys.</i> , 1991, Vol. 70, p. 3899. <i>no month</i>				
	BC	S.J. McLain, et al., "Multiple Metal-Carbon Bonds. The Reaction of Niobium and Tantalum Neopentylidene Complexes with Simple Olefins: A Route to Metallocyclopentanes", <i>J. Amer. Chem. Soc.</i> , 1977, Vol. 99, p. 3519. <i>no month</i>				
	BD	R. R. Schrock, "Alkylidene Complexes of Niobium and Tantalum", <i>Acc. Chem. Res.</i> , 1979, Vol. 12, p. 98. <i>no month</i>				
	BE	R. R. Schrock, S.M. Rockledge, "Tantalum Complexes Containing Diimido Bridging Dinitrogen Ligands" <i>J. Amer. Chem. Soc.</i> , 1980, Vol. 102, pp. 7809-7811 <i>no month</i>				
	BF	Yuan-Wei Chao et al, "Preparation and Properties of Amido Halide Complexes of Niobium and Tantalum and Reactions with Alkynes", <i>Polyhedron</i> , 1990, Vol. 9, No. 22, pp. 2709-2716. <i>no month</i>				
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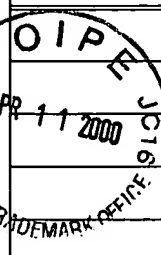
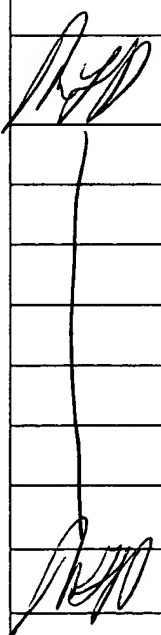
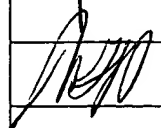
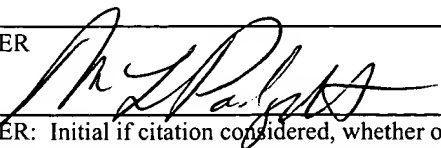
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BG	4,147,556	4/79	Donley	106	287.18		
BH	4,281,037	7/81	Choung	427	407.3		
BI	5,412,129	5/2/95	DiCarolis	556	40		
BJ	5,204,314	4/20/93	Kirlin et al.	505	1		
BK	5,225,561	7/6/93	Kirlin et al.	546	256		
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BL	John D. Protasiewicz, "Synthesis and Structural Characterization of Low Valent Group V Phosphine Complexes", <i>Inorg. Chem.</i> , 1992, Vol. 31, pp. 4134-4142. <i>no month</i>						
BM	D.C. Bradley et al, "Nuclear Magnetic Resonance Studies on Niobium and Tantalum Penta-alkoxides", <i>J. Chem. Soc. (A)</i> , 1968, pp.219-223 <i>no month</i>						
BN	M.H. Tsai, S.C. Sun, C.P. Lee, H.T. Chiu, C.E. Tsai, S.H. Chuang, S.C. Wu, "Metal-Organic Chemical Vapor Deposition of Tantalum Nitride Barrier Layers for ULSI Applications", <i>Thin Solid Films</i> , 1995, Vol. 270, pp. 531-536. <i>no month</i>						
BO	H.T. Chiu, W.P. Chang, "Effect of Hydrogen on Deposition of Tantalum Nitride Thin Films From Ethylimidotantalum Complex", <i>J. Mater. Sci. Lett.</i> , 1992, Vol. 11, pp. 570-572. <i>no month</i>						
BP	K. Sugiyama, et al., "Low Temperature Deposition of Metal Nitrides by Thermal Decomposition of Organometallic Compounds", <i>J. Electrochem. Soc.</i> , 1975, Vol. 122, p. 1545. <i>no month</i>						
BQ	M.G. Simmonds, W.L. Gladfelter, "Chemical Vapor Deposition of Aluminum", <i>The Chemistry of Metal CVD</i> , T.T. Kodas, M.J. Hampden-Smith, Eds., VCH, New York, 1994. <i>no month</i>						
BR	T.D. Tilley, <i>The Chemistry of Silicon Compounds</i> , S. Patai, Z. Rappoport Eds., Wiley: New York, 1989, Vol. 2. P. 1415 <i>no month</i>						
BS	Q. Jiang, P.J. Carroll, D. H. Berry, "Synthesis of Mono- and Bis(silyl) Complexes of Tantalum" <i>Organometallics</i> , 1991, Vol. 10, pp. 3648-3655 <i>no month</i>						
BT	"Diffusion Barriers for GaAs and InP Devices", <i>NASA, Tech Briefs</i> , June 1997, p. 42.						
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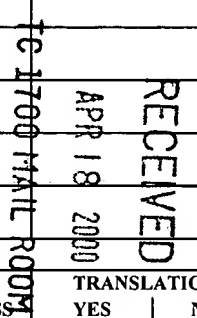
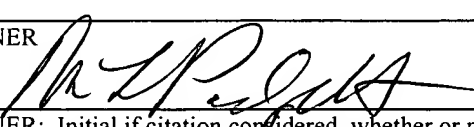
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	BU	4,401,474	8/83	Donley	106	243	APR 11 2000
	BV	4,726,938	2/88	Rollat, et al.	423	DIG.14	APR 11 2000
	BW	4,898,842	2/90	David	501	12-X	APR 11 2000
	BX	4,908,065	3/90	Tanitsu et al.	106	287.19-X	APR 11 2000
	BY	5,165,960	11/24/92	Platts	427	166	APR 11 2000
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		DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO
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	BZ	"Adherent and Stable Metallization of CVD Diamond", <i>NASA Tech Briefs</i> , June 1997, pp. 63-64.					
	CA	M.F. Lappert, et al, <i>Metal and Metalloid Amides</i> , John Wiley and Sons, pp. 470-543. <i>date no year</i>					
	CB	R.P.M. Werner, A.H. Filbey, S.A. Manastyrsky, "Tetracarbonylcyclopentadienyl Compounds of the Group V Transition Metals", <i>Inorg. Chem.</i> , 1964, Vol. 3, pp. 298-300 <i>no month</i>					
	CC	Z. Xue, L. Li, L. K. Hoyt, J.B. Diminnie, J.L. Pollitte, "Early Transition Metal Silyl Complexes Free from Anionic Π -Ligands. A new Family of Alkyl, Alkylidene, and Alkylidyne Compounds", <i>J. Am. Chem. Soc.</i> , 1994, Vol. 116, pp. 2169-2170 <i>no month</i>					
	CD	W.A. Nugent, R.L. Harlow, "Structure and Reactivity in the Group 5B t-Butylimido Complexes (Me_2N) ₃ M=Nbu ⁺ ; X-Ray Crystal and Molecular Structure of N-t-Butylimidotris(dimethylamido)tantalum", <i>J.C.S. Chem. Comm.</i> , 1978, pp. 579-580. <i>no month</i>					
	CE	A.A. Finn, L. Brandt, H.D. Kaesz, R.F. Hicks, "Chemical Vapor Deposition of Platinum, Palladium and Nickel", <i>The Chemistry of Metal CVD</i> , T.T. Kodos, M.J. Hampden-Smith, Eds., VCH, New York, 1994. <i>no month</i>					
	CF	Pradeep P. Phule, "Sol-gel Synthesis of Ferroelectric Lithium Tantalate Ceramics: FTIR Investigation of the Molecular Modification of Tantalum Ethoxide", <i>J. Mater. Res.</i> , 1993, Vol.8, No. 2, pp. 334-338 <i>no month</i>					
	CG	P.N. Kapoor et al, "Organic Compounds of Niobium and tantalum IV Reactions of Niobium and Tantalum Pentaethoxides with B-Diketones", <i>J. of the Less- Common Metals</i> , 1965, Vol. 8., pp. 339-346 <i>no month</i>					
	CH	R.L. Deutsher, et al, "Eight Coordinate Tetrakis-Chelate Complexes of Niobium(IV) and Tantalum(V)", <i>Inorganica Chimica Acta</i> , 1970, pp. 645-650 <i>no month</i>					
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	CI	3,988,332	1972 10/14/76 R. R. Schrock	260 429R	TC 1700 MAIL ROOM RECEIVED APR 18 2000
	CJ	4,510,222	4/9/85 Okunaka et al.	430 5	
	CK	4,529,427	7/16/85 French	65 3.12	
	CL	5,679,815	10/21/97 Kirilin et al.	556 42	
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OTHER DOCUMENTS (Including Author, Title, Journal-Date, Page Number, Etc.)					
	CM	R.R. Schrock et al, "Multiple Metal Carbon Bonds. "Preparation and Characterization of Formation of the Tantalum and Niobium Neopentylidene Complexes, M (CH ₂ CMe ₃) ₃ (CHCMe ₃)", J. Amer. Chem. Soc., 1978, Vol. 100:11, pp. 3359-3370. <i>no month</i>			
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	CO	Malcolm H. Chisolm, et al, "Chloro(dimethylamido) Compounds of Tantalum(V): Preparations, Properties, and Structures of [Ta(NMe ₂) ₃ Cl ₂], TaCl ₃ (NMe ₂) ₂ (HNMe ₂), Ta(NMe ₂) ₃ Cl ₂ (HNMe ₂), and [TaCl ₂ (NMe ₂) ₂ (HNMe ₂) ₂ O]" <i>no month</i>			
	CP	H.-K. Shin, et al., "MOCVD of Titanium Nitride from a New Precursor, Ti[N(CH ₃)C ₂ H ₅] ₄ ", Chem. Mater., 1997, Vol. 9, pp. 76-80. <i>no month</i>			
	CQ	T. Kee, <u>Coordination Chemistry</u> , 1993, pp. 171-185. <i>no month</i>			
	CR	M. Stolz, K. Heiber, "Universal Chemical Vapour Deposition System for Metallurgical Coatings", <i>Thin Solid Films</i> , 1983, Vol. 100, pp. 209-218. <i>no month</i>			
	CS	T. Don Tilley, "The Reactivity of Transition Metal-Silicon Compounds", Final Technical Report, Defense Technical Information Center, AD Number A200371, 1988 August 8.			
	CT	M.H. Tsai, S.C. Sun, C.P. Lee, H.T. Chiu, S.H. Chuang, "Metalorganic Chemical Vapor Deposition of Tungsten Nitride for Advanced Metallization", <i>Appl. Phys. Lett.</i> , 1996, Vol. 68, pp. 1412-1414 <i>no month</i>			
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	CU	M.H. Tsai, S.C. Sun, H.T. Chiu, C.E. Tsai, S.H. Chuang, "Metalorganic Chemical Vapor Deposition of Tantalum Nitride by Tertbutylimidotris(diethylamido)tantalum for Advanced Metallization" <i>Appl. Phys. Lett.</i> , 1995, Vol.67, pp. 1128-1130. no month				
	CV	S.C. Sun et al, "Diffusion Barrier Properties of CVD Tantalum-Nitride for Aluminum and Copper Interconnections", VMIC Conference, 1995 ISMIG, June 27-29, pp. 157-161.				
	CW	H.T. Chiu, S. H. Chuang, "Tungsten Nitride Thin Films Prepared by MOCVD", <i>J. Mater. Res.</i> , 1993, Vol.8, pp. 1353-1360. no month				
	CX	P. Catania, et al., "Low Resistivity Body-Centered Cubic Tantalum Thin Films as Diffusion Barriers Between Copper and Silicon", <i>J. Vac. Sci. Tech., A</i> , 1992, A10 pp. 3318-3321 no month				
	CY	E. Blanquet, et al., "Evaluation of LPCVD Me-Si-N (Me=Ta, Ti, W, Re) Diffusion Barriers for Cu Metallizations", <i>Microelectronic Engineering</i> , 1997, Vol. 37, pp. 189-195. no month				
	CZ	Y.W. Chao, et al., "Preparation and Properties of Tantalum Imido Complexes and Their Reactions with Alkynes. Coordination Control through Multiple Metal-Ligand Bonding", <i>Inorg. Chem.</i> , 1989, Vol. 28, pp. 3860-3868. no month				
	DA	M. M. Banaszak, et al., "Ammonolysis of Tantalum Alkyls: Formation of Cubic TaN and a Trimeric Nitride, [Cp*MeTaN] ₃ ", <i>Inorg. Chem.</i> 1990, Vol. 29, pp. 1518-1526. no month				
	DB	Zhang, J. et al., "Single Liquid Source Plasma-Enhanced Metalorganic Chemical Vapor Deposition of High Quality YBa ₂ Cu ₃ O _{7-x} Thin Films", <i>Appl. Phys. Lett.</i> , 1992, Vol. 61, pp. 2884-2886. no month				
	DC	Van Buskirk, P.C. et al., "MOCVD Growth of BaTiO ₃ in an 8" Single-Wafer CVD System," Proc. ISAF 92, Eighth Int'l Symp. Appl. Ferroelectrics, Agu. 31-Sept. 2, 1992. no month				
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	3,288,829	11/29/98 66	Wilkinson	260	429	
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DD	Hiskes, R. et al., "Single Source Metalorganic Chemical Vapor Deposition of Low Microwave Surface Resistance YBa ₂ Cu ₃ O ₇ ," Appl. Phys. Lett. 1991, Vol. 59, pp. 606-607. <i>no month</i>					
DE	Zhang et al., "Plasma Enhanced Metalorganic Chemical Vapor Deposition of Conductive Oxide Electrodes for Ferroelectric BaTiO ₃ Capacitors." Mater. Res. Soc. Symp. Proc. Vol. 310, pp. 249-254 (1993). <i>no month</i>					
DF	Zhang et al., "Metal Organic Chemical Vapor Deposition of LaSrCoO Electrodes for Ferroelectric Capacitors," 6th ISAF Mtg, March, 1994					
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